

2004 Annual Report

South Carolina's Nonpoint Source Pollution Management Program

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WHAT IS NONPOINT SOURCE POLLUTION AND WHAT IS BEING DONE ABOUT IT?

Why is there still water that's unfit for swimming, fishing or drinking? Why are many species of plants and animals disappearing from many rivers, lakes, and coastal waters?

The United States has made tremendous advances in the past 30 years to clean up the aquatic environment by controlling pollution from industries and sewage treatment plants. Unfortunately, we did not do enough to control pollution from diffuse, or nonpoint sources. Today, nonpoint source (NPS) pollution remains the nation's largest source of water quality problems. It's the main reason that approximately 40 percent of our nation's surveyed rivers, lakes, and estuaries are not clean enough to meet basic uses such as fishing or swimming.

NPS pollution occurs when rainfall or irrigation runs over land or through the ground, picks up pollutants, and deposits them into rivers, lakes, and coastal waters or introduces them into groundwater. It may also come from atmospheric deposition, that is, pollutants settling onto water from the air. NPS pollution also includes adverse changes to the vegetation, shape, and flow of streams and other aquatic systems, called hydrologic modification. Imagine the path taken by a drop of rain from the time it hits the ground to when it reaches a river, groundwater, or the ocean. Any pollutant it picks up on its journey can become part of the NPS problem.

NPS pollution is widespread because it can occur anywhere activities disturb the land or water. Agriculture, forestry, grazing, septic systems, recreational boating, urban runoff, construction, physical changes to stream channels, and habitat degradation are all potential sources of NPS pollution. Careless or uninformed household management also contributes to NPS pollution problems.

The most common NPS pollutant in South Carolina is fecal coliform bacteria. Other common ones include nutrients such as phosphorus and nitrogen, pesticides, oil and grease, toxic chemicals, and heavy metals. These wash into water bodies, most often in sediments, from agricultural land, small and medium-sized animal feeding operations, construction sites, and other areas of disturbance. In urban areas, wash-off from parking lots, stormdrains, and roads are also major sources. Beach closures, destroyed aquatic and marine habitat, unsafe drinking water, fish kills, and many other severe environmental and human health problems result from NPS pollution. The pollutants also ruin the beauty of healthy, clean water habitats. Each year the United States spends millions of dollars to restore and protect the areas damaged by NPS pollutants.



Progress

During the last 15 years, our country has made significant headway in addressing NPS pollution. At the federal level, recent NPS control programs include the Nonpoint Source Management Program established by the 1987 Clean Water Act Amendments, and the Coastal Nonpoint Pollution Control Program established by the 1990 Coastal Zone Act Reauthorization Amendments. Other recent federal programs, as well as state, territorial, tribal and local programs also tackle NPS problems. At the state level, South Carolina developed and began implementing a comprehensive Nonpoint Source Management Program in 1990.

In addition, public and private groups have developed and used pollution prevention and pollution reduction initiatives and NPS pollution controls, known as management measures, to clean up our water efficiently. Water quality monitoring and environmental education activities supported by government agencies, industry, volunteer groups, and schools have provided information about NPS pollution and have helped to determine the effectiveness of management techniques.

Also, use of the watershed approach has facilitated addressing water quality problems caused by NPS pollution. The watershed approach looks at not only a waterbody but also the entire area that drains into it. This allows communities to focus resources on a watershed's most serious water quality problems—which, in many instances, are caused by NPS pollution.

Just as important, more citizens are practicing water and resource conservation and participating in stream walks, beach cleanups, and other environmental activities sponsored by community-based organizations. By helping out in such efforts, citizens address the nation's largest water quality problem, and ensure that even more of our rivers, lakes, and coastal waters become safe for swimming, fishing, drinking, and aquatic life.

ABOUT THE SOUTH CAROLINA NPS MANAGEMENT PROGRAM

To address nonpoint source water pollution in South Carolina, a comprehensive management strategy was developed and implemented by the State beginning in the early 90s. In 1999, the strategy was revised and updated to reflect new goals and programs, and to provide a more focused approach to cleanup.

The Program is currently being updated again, since interim strategies are for a five-year period. The State's Nonpoint source Taskforce, a stakeholder advisory group, met in early 2004 to provide input for the latest Update, and it should be finalized in 2005.

During 2004, the South Carolina Department of Health and Environmental Control, with the cooperation of other agencies, organizations, and a variety of stakeholders, is actively implementing the control strategy embodied in the South Carolina Nonpoint Source Management Program. This program is statewide, and fulfills the requirements of Section 319 of the Clean Water Act and Section 6217 of the Coastal Zone Act Reauthorization Amendments, two federal laws with nonpoint source provisions.

The current South Carolina Nonpoint Source Management Program Update outlines the State's strategic plan for addressing statewide water quality impairments attributable to nonpoint source pollution. The Update lists 20 overall, long-term NPS management program goals for the fifteen-year period including 1999 through 2013. Each of the long-term goals is backed by a series of five-year action strategies that serve to implement these goals. Many of the action strategies are in turn implemented through a series of milestones, most of which are components of Section 319 funded projects. The State's NPS Management Program is two-pronged, focusing on reducing NPS impacts in priority watersheds, and also implementing activities statewide to reduce and prevent NPS pollution. Components include both regulatory and voluntary approaches.

To facilitate success in achieving water quality improvements, South Carolina's NPS program focuses on impaired waterbodies (as indicated on the 303(d) list). The State's Coastal Nonpoint Pollution Control Program under Federal Coastal Zone Management legislation is also being implemented. Further, the State is developing and implementing NPS related Total Maximum Daily Loads (TMDLs). Funding for this effort comes in large part from Environmental Protection Agency Section 319 funds. One hundred percent of South Carolina's allocation of incremental Section 319 funds is used for this purpose. Funding from other sources, such as USDA Environmental Quality Incentive Program (EQIP) cost share funds, are incorporated into implementation projects where appropriate and when available.

Categories of NPS in South Carolina include agriculture, forestry, urban areas, marinas and recreational boating, mining, hydrologic modification, wetlands disturbance, land application of wastes, and atmospheric deposition. Technology based controls, a.k.a. management measures or best management practices, are employed to address NPS categorical impacts. The Management Plan Update describes specific management measures for each category as well as implementation schedules. South Carolina has the legal authority to implement all necessary management measures.



The South Carolina Department of Health and Environmental Control is responsible for Program implementation, but it is dependent upon the cooperation of all levels of government in the state, private sector stakeholders, and especially the citizens of the state, in order to realize positive results. Many organizations have expertise that is beneficial to the NPS pollution management program. For example, trade and environmental organizations have in-place delivery mechanisms that reach persons capable of implementing NPS controls. These partnership roles are described in the Update.

A system of evaluation and monitoring techniques is a necessary component of the NPS Management Program, in order to judge its progress and success. Evaluation will show whether the Program is attaining the State's overall water quality vision, stated long-term goals, and five-year action strategies. In South Carolina's Program, several monitoring and tracking efforts are described that address available information on improvements in water quality, implementation milestones, and available information on reductions in NPS pollution. Evaluation techniques include water quality monitoring, tracking management measure implementation, pollutant load reduction, and stakeholder feedback.

The NPS Management Program incorporates the nine key elements that are described in Environmental Protection Agency NPS guidance, which include:

1. The South Carolina program contains explicit short-term and long-term goals, objectives, and strategies to protect surface and groundwaters.
2. South Carolina strengthens its working partnerships and linkages with appropriate state, regional, and local entities, private sector groups, citizens groups, and federal agencies.
3. South Carolina uses a balanced approach that emphasizes both statewide NPS programs and on-the-ground management of individual watersheds where waters are impaired and threatened.
4. The South Carolina program abates known water quality impairments from NPS pollution and prevents significant threats from present and future activities.
5. The South Carolina program identifies waters and their watersheds that are impaired by NPS pollution and identifies important unimpaired waters that are threatened. Further, the State establishes a process to progressively address these identified waters by conducting more detailed watershed assessments and developing implementation plans, and then by implementing those plans.
6. South Carolina reviews, upgrades, and implements all program components required by Section 319 of the Clean Water Act, and establishes flexible, targeted, and iterative approaches to achieve and maintain beneficial uses of water.
7. South Carolina identifies federal lands and activities, which are not managed consistently with State NPS, program objectives. Where appropriate, the State seeks EPA assistance to help resolve issues.
8. South Carolina manages and implements its NPS program efficiently and effectively, including necessary financial management.
9. South Carolina periodically reviews and evaluates its NPS management program using environmental and functional measures of success, and revises its NPS assessment and its management program at least every five years.

Through the use of a framework that addresses these key elements, South Carolina will continue to have an effective NPS program that is designed to achieve and maintain beneficial uses of water.

IMPLEMENTING THE STRATEGY

South Carolina is taking full advantage of Clean Water Act Section 319 funding that is available from the Environmental Protection Agency (EPA) to prevent and reduce NPS water pollution in the state. The annual grant funds and resultant workplan is the principle financial mechanism for implementing the goals of the NPS Management Program. All projects described in the workplan are linked to one or more of the goals described in the NPS Management Program. In order to meet the goals of the NPS Management Program, emphasis has shifted over the last several years toward implementing projects that address specific NPS impairments in priority waterbodies/watersheds. Beginning in fiscal year 2003, in accordance with the latest guidance from EPA, South Carolina began focusing resources exclusively on watersheds where nonpoint source Total Maximum Daily Loads (TMDLs) have been developed.

While Section 319 grant funds provide significant financial resources for implementing the NPS Management Program, it is actually much broader in scope. There are a variety of other programs including enforceable mechanisms that are applied to NPS pollution prevention. Within DHEC, several regulatory programs are administered including agricultural animal facility permitting and compliance, erosion and sediment control permitting and compliance, municipal and industrial facility NPDES stormwater permitting, coastal zone permitting, state water quality standards and Pollution Control Act compliance, Section 401 certification for wetlands disturbance and hydrologic modification, and onsite wastewater system standards and permitting. Further, the SC Forestry Commission implements a very successful forestry Best Management Practice (BMP) compliance program. Since its inception in the early 1990s, the rate of compliance has increased significantly.

Another significant source of funding for nonpoint source abatement projects is a state and federally supported low interest loan program known as the State Revolving Fund (SRF). The SRF may be preferable to local governments for large budget projects since more funds are available than through the Section 319 grant program. Several local governments have applied for SRF loans for NPS projects.

The 1999 update to the NPS Management Program plan incorporates South Carolina's Coastal Nonpoint Pollution Control Program (CNPCP) under Section 6217 of the Coastal Zone Act Reauthorization Amendments. The purpose of the CNPCP is to address nonpoint source pollution issues within the coastal zone and ensure that all applicable management measures are implemented to protect and restore the State's coastal resources.

The National Oceanic and Atmospheric Administration and the Environmental Protection Agency, in April of 2001, conditionally approved the State's CNPCP with one remaining condition. That condition relates to the vertical separation distance between an onsite sewage disposal system's drain field and the seasonal high water table. South Carolina continues to address this issue and is actively working to satisfy the remaining requirements needed for full program approval by NOAA and EPA. DHEC's Office of Ocean and Coastal Resource Management prepared a 15-year strategy for the CNPCP, which describes general objectives for the comprehensive and effective management of polluted runoff within the coastal zone.

Stakeholders play an integral part in the State's NPS strategy. Federal agencies such as the US Department of Agriculture's Natural Resource

Conservation Service (NRCS), Farm Service Agency (FSA), US Forest Service (USFS), US Army Corps of Engineers (USACOE), and United States Geological Survey (USGS) have major roles. State agencies with complementary programs include the Department of Natural Resources, Clemson Extension Service, and the Forestry Commission. Non-profit groups such as the SC Wildlife Federation, Sierra Club, and SC Coastal Conservation League, and industry trade organizations including the Farm Bureau, SC Association of Conservation Districts, Cattlemen's Association, and the Forestry Association are also active participants.

In fiscal year 2004, South Carolina's Section 319 grant workplan contains projects funded under two different EPA defined categories: annual and incremental. The annual allocation of approximately \$1.5 million is used to implement projects that address NPS pollution with activities and programs that are statewide, while the incremental allocation of \$1.5 million is used to implement nonpoint source TMDL projects (see other Sections of this report for more details on TMDLs). The total amount of the incremental funds are put into a workplan project and allocated periodically for the specific implementation projects.

The list of approved NPS (mostly for fecal coliform bacteria) TMDLs currently tops 188, and is constantly growing as more and more are finalized. Cooperating agencies and organizations throughout the state are becoming highly involved in the implementation process. One or several can jointly implement projects in a given watershed using the Section 319 funds. Projects to be implemented by outside agencies and organizations are selected using a competitive proposal process. The Request For Proposals (RFP) is promulgated several times per year (roughly quarterly) through various meetings, workshops, web site, mailings, and advertisements in the publication South Carolina Business Opportunities, a biweekly publication with wide circulation.

Applicants must follow specific guidelines, which are published on the DHEC web site (www.scdhec.gov/water) to develop a proposal. The proposed project must implement an approved TMDL or alternatively develop and implement a TMDL; the objective must be to reduce the pollutant load so as to allow streams in the watershed to meet water quality standards. The guidelines specify that the project must address the eight elements of a well-designed watershed implementation project as specified by EPA.

Proposals received as a result of an RFP are reviewed and selected by a seven-member review committee. A proposed project must meet all of the criteria described above to be selected for funding. A maximum of \$300,000 in federal funds per project is allowed unless the project covers two or more adjacent watersheds. The federal funds must be matched with at least 40 percent in non-federal funds. Combining funding from other sources such as USDA EQIP funds is encouraged.

In the FY 2004 workplan, annual allocation projects are statewide or regional in scope and continue to institutionalize the state's nonpoint source program. Many of these projects address various nonpoint source categories including forestry, urban runoff, animal agriculture, wetlands, construction and groundwater impacts. Annual allocation category projects are implemented by SC DHEC staff and the SC Forestry Commission. A significant portion of the annual allocation is used for NPS education and outreach, NPS monitoring, watershed management, compliance, and TMDL development. It is also used to continue implementation of a statewide forestry BMP compliance program.

MEETING THE GOALS OF THE PROGRAM

The SC NPS Management Program document describes 17 long-term goals and guiding principles that facilitate and promote the state's efforts to manage NPS water pollution. The goals are scheduled to be attained within a 15-year period beginning in 1999. To assure attainment, a number of quantifiable five-year action strategies were developed and described. Each set of strategies includes a short-term goal, the implementing mechanism, the implementing agency(s), and a reference to the antecedent long-term goal. Many of the action strategies are in turn supported by milestones, which are associated with implementation of Section 319 projects. The Environmental Protection Agency reviews and critiques South Carolina's nonpoint source program twice each year. The FY 2004 mid-year report cited significant progress in the attainment of several of the goals. Among the comments, EPA said, "South Carolina is making significant progress in achieving their short-term and long-term goals, objectives, and strategies. The program's focus has been on their long-term goals 1 – 7, which encompasses water quality assessment to identify NPS problem areas and development and implementation of TMDLs on their 303(d) listed streams" and "South Carolina's performance has been exceptional in meeting grant requirements, grant conditions, milestones, and workplan commitments."

Currently, the State is on track toward meeting interim milestones and strategies that lead to full attainment of the long-term goals by the specified deadline. The current status of several of these long-term goals is described below.

Goal one addresses assessing water quality and other methods to identify NPS impacted problem areas so that management solutions can be implemented. See "A 101 on the 303(d)," "Graham Creek Restoration Project," "Microbial Source Tracking, a New Assessment Tool?" and "Getting to the Source on the Isle of Palms."

Goal two requires that all applicable management measures to protect and restore the state's coastal waters are in-place within 15 years. To accomplish this goal the state, through DHEC's Office of Ocean and Coastal Resources Management (OCRM), is implementing South Carolina's Coastal Nonpoint Pollution Control Program (CNPCP) as required by Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA). See the following article titled "South Carolina's Coastal Nonpoint Program." Currently, the Program has conditional approval from NOAA and EPA. Only one condition remains, pertaining to on-site disposal system (OSDS) drainfield and seasonal high water table separation distances. During 2004, DHEC designed, and EPA and NOAA approved, a study that will determine if present and/or proposed separation distances are protective of surface water and wells. The study would test the levels of pollutants reaching groundwater at several sites over a period of six months. It is hoped that if the study shows that current separation distance standards are adequate to protect water quality, the program will be fully approved.

Goals four, five, and seven of the Program are interrelated. Goal four focuses on addressing problem pollutants that are listed on the 303(d) list and goal five describes the use of 319 funds at the watershed level.

Goal four says South Carolina will have the controls in place to delist the waterbodies. To accomplish this, the state will develop and implement Total Maximum Daily Loads (TMDLs) for all impacted waterbodies listed on the

303(d) list. Goal seven says South Carolina will develop those TMDLs during the 15-year period ending in 2013. To accomplish these three goals, and to make an actual positive impact on water quality, the State has begun to focus its Section 319 grant resources on TMDL development and implementation. To date, 188 NPS TMDLs have been developed by DHEC staff and under contract. Several hundred more are currently being developed.

Ten projects to implement 29 TMDLs in specific watersheds have been awarded and are under way: Coneross Creek/Beaverdam Creek watersheds in Oconee and Pickens Counties, Bush River watershed in Newberry County, Rocky Creek in Chester County, an un-named tributary to the Catawba River in York County, Thompson Creek in Chesterfield County, Fork Creek in Chesterfield County, Scape Ore Creek in Lee/Kershaw Counties, Upper Little Pee Dee River in Dillon County, Fishing Creek in York County, and Twelve Mile Creek in Pickens County. These projects are implementing control measures in order to reduce the pollutant load, e.g. fecal coliform bacteria, to a level where state water quality standards are met. See the following articles, "TMDL, a Tool for Water Quality Improvement", and "TMDL Implementation Projects Underway."

Goal six describes using Section 319 annual grant funds to reduce and prevent NPS pollution through activities that implement regulatory, outreach, assessment, and technical assistance activities. These activities complement the Watershed Restoration Action Strategy implementation and help to insure attainment of goal three. More and more, regulatory programs at the state and local level that serve to reduce nonpoint source pollution from many sources are being put in place. For example, South Carolina has an innovative program to assure that compliance with water quality BMPs is maintained on tree harvesting sites. See the following article titled "Forestry BMP Program Raises Rates of Compliance." In an effort to encourage local governments to adopt zoning and development strategies that lead to improved water quality, several Nonpoint Education for Municipal Officials (NEMO) programs have been conducted around the state. See "NEMO in the BCD Region" for a description of a recently concluded project in the Charleston area.

Goal six also discusses the importance of outreach programs and activities. Education is a critical component of managing NPS pollution. Unless governmental agencies, educational institutions, and stakeholder groups spread the word to local communities and individual citizens about the water quality problems, and what works in preventing or solving those problems, people will not step forward to implement solutions to prevent or solve these problems. That is why education and outreach programs are critical to the success of any NPS management program. The EPA sponsored "Getting In Step" program is a comprehensive tool for watershed project managers, local government staff, and others in conducting effective outreach campaigns. Earlier this year DHEC produced a day-long "Getting In Step" workshop which was attended by almost 100. See "Workshop Yields Results" for details.

The Section 319 grant funds several NPS outreach staff within DHEC, as well as funding outreach activities that are a component of specific Section 319 projects. In fact, any watershed project funded through Section 319 should contain an effective outreach component. Elsewhere in this report you will see the results of some unique outreach activities being carried out by DHEC staff and project grantees: "Beaufort County Model River Buffer Project," "New SC Shoreline Guide an Excellent Tool for Water Quality Protection," and "USC's Green Dorm Means Cleaner Stormwater."

Maintenance and expansion of partnerships and cooperative opportunities with stakeholders, other agencies, and citizens is the focus of goal eight. Numerous activities are currently being conducted with students, homeowners, and local governments that support this goal. In particular, federal agency support of the State's NPS Program is critical. The USDA Natural Resource Conservation Service (NRCS) has long been a partner with the state in working to improve water quality. Membership by DHEC NPS staff on the NRCS State Technical Committee and NRCS staff membership on the State Nonpoint Source Task Force facilitates cooperation between the two agencies. Further, DHEC and NRCS have been jointly exploring the ways to focus Environmental Quality Incentive Program (EQIP) cost-share funds in watersheds where nonpoint source water quality problems occur, especially in watersheds where TMDLs are being implemented. This goal has been realized so far in one project area, the Coneross Creek/Beaverdam Creek watershed. The Oconee County NRCS is a partner in the project and has secured \$110,000 in EQIP funds for cost share by farmers for water quality BMPs. The infusion of the additional funds will help to guarantee that all nonpoint sources in the watershed are addressed, and sufficient reduction in fecal coliform bacteria is achieved so as to allow the streams to meet water quality standards.

To assure effective and efficient use of financial resources and to leverage funds with other programs is the focus of goal nine. The State Revolving Fund (SRF) provides low interest loans for utility infrastructure projects, usually sewage treatment facility construction. The fund can also be used to fund nonpoint source projects, however, and NPS staff have promoted this funding source to local governments to implement stormwater BMPs. This effort resulted in the award of three separate loans for more than \$3 million the City of Rock Hill for stream restoration/urban stormwater projects in three small watersheds within the City. Two other municipalities, Georgetown and Florence, have applied to use this funding source for large budget projects to control urban stormwater and restore urban streams. Currently, these applications are under review.

The Environmental Protection Agency updated their Strategic Plan in 2003 to include several five-year results-based performance goals to protect the environment. South Carolina will incorporate their applicable goals and objectives into the state's NPS Management Program. EPA goal two, clean and safe water, has several objectives and sub objectives related to NPS. In that regard, EPA has asked states to report on four of these NPS objectives:

1. The number of watershed-based plans (and acres covered) supported under state nonpoint program grants developed since 2002:

South Carolina has developed ten watershed-based plans covering 970,698 acres within the state.

2. The number of watershed-based plans (and acres covered) supported under state nonpoint program grants developed since 2002 that are being substantially implemented:

South Carolina has developed and is implementing seven watershed-based plans covering 664,251 acres within the state.

3. The number of waterbodies identified by states in the year 2000 as being impaired by nonpoint sources that are fully restored:

From 2000 to 2002, a net total of 126 impaired waterbodies were removed the state's 303(d) list because the water quality standard was attained.

From 2002 to 2004, a net total of 88 impaired waterbodies were removed

from the state's 303(d) list because the water quality standard was attained.

4. The annual reduction in lbs/tons of nitrogen, phosphorus, and sediment from nonpoint sources to waterbodies:

In cooperation with its 319 partners, SCDHEC is developing methodologies for estimating pollutant load reductions from past and ongoing projects. In accordance with EPA instructions, these initial estimations have focused on sediment and nutrient pollution. Among the projects with current annual load reduction estimates are:

Bush River Fecal Coliform Reduction Project: Estimates of 12,800 tons of sediment, 105 tons of nitrogen, and 64 tons of phosphorus per year from project funded pastureland management practices within a 115 square mile watershed in the piedmont region of S.C. These practices include 12,000 ft of filter strips, 9,000 ft of fencing, 2,600 acres of conservation tillage and 3,500 acres of nutrient management plans implemented.

South Carolina Forestry BMP Program: This statewide program consisting of over 475 forestry sites was estimated to have prevented 1775 tons of sediment, 99,610 lbs of nitrogen and 11,230 lbs phosphorus in 2002.

Identification and Mitigation of NPS Fecal Coliform Pollution in the Rocky Creek Watershed: Using a directed monitoring effort, the sub-grantees in this project installed arrays of BMPs at several cooperating agricultural sites. While focusing in on bacteria, there are also reductions in sediment and nutrients expected. The bacteria reductions are expected mainly through cattle exclusion and are estimated at 3.84×10^{12} per year. Sediment was estimated at 50 tons per year. Reductions of 47 lbs of total nitrogen and 1336 lbs of phosphorus per year are also expected.

North Elementary Constructed Wetlands Project: 4.1 tons sediment, 37 lbs phosphorus, and 212 lbs nitrogen removed through wetlands treatment of a 33-acre school site.

Constructed Wetlands as Alternative Treatment for Failed Septic System Tile Fields: 36.47lbs phosphorus, 109.12 lbs total suspended solids, and 2.28×10^{12} bacteria per year from seven rehabilitated septic systems using wetlands treatment.

When totaled, these figures translate to an annual reduction of 14,630 tons of sediment, 155 tons nitrogen, and 70 tons phosphorus. Other ongoing project are producing similar results, but the data is not available yet.

These examples illustrate the ongoing effort to estimate results obtained from the expenditure of Section 319 funds. Other projects will yield similar reductions, as further estimations are obtained. Current and future grantees will be required to supply more detailed information in their interim and final reports so that the variables required to make these estimations are more accurate and readily available. They are reported to EPA using the Grants Reporting System (GRTS). As always the bottom line for effectiveness, particularly in 319 funded TMDL projects, is measurable improvement in water quality. SCDHEC will continue to assess water quality through its extensive ambient water quality monitoring strategy.

A 101 ON THE 303 (d)

When talking about water quality, the term 303(d) list, or list of impaired waters, is often heard. So what is this list?

Section 303(d) of the Clean Water Act mandates that every two years each state must compile a list of waters that do not meet water quality standards. In South Carolina, portions of streams, rivers, lakes and other waterways are placed on the 303(d) list when a five-year period of monitoring data indicates that the established state water quality standards are not met.

Waters can be impaired for a variety of causes including but not limited to: bacteria, phosphorus, heavy metals, etc. Sources of these impairments vary with land uses such as urban, rural or agricultural.

Once a waterway is on the 303(d) list, it is targeted for water quality improvement. Often local stakeholders are eligible for grants for improvement projects through DHEC. South Carolina has prepared and the Environmental Protection Agency approved the 2004 303(d) list in April of this year. To see the 2004 list, please visit the web at www.scdhec.gov/water/html/tmdl.html.

GRAHAM CREEK RESTORATION PROJECT

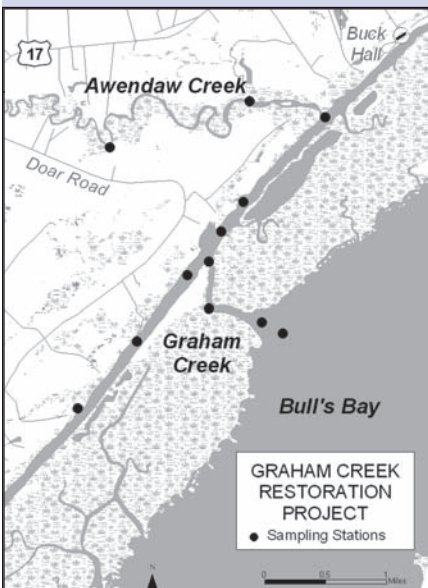
The South Carolina Department of Health and Environmental Control's Nonpoint Source Monitoring Team, in conjunction with the Shellfish Sanitation Section, has initiated the Graham Creek Restoration Project in an attempt to reopen the creek to shellfish harvesting. Graham Creek is currently classified as Restricted by DHEC's Shellfish Sanitation Section due to elevated bacteria levels. This means shellfish (oysters, clams) may not be harvested from beds along this creek.

The Shellfish Sanitation Program is responsible for monitoring of 570,304 acres of shellfish growing waters and determining their classification. Each month, staff from three coastal offices routinely sample 463 monitoring stations located throughout the state's estuaries. Samples are analyzed for fecal coliform bacteria, and the data generated is used to determine the classification of the respective waters. For more information on the Shellfish Sanitation Program, please visit www.scdhec.gov/water/html/shellfish.html.

Graham Creek, a small creek in the northeastern corner of Charleston County, connects the Atlantic Intracoastal Waterway with Bulls Bay. The restoration project is currently in the monitoring phase, which will continue for at least one year. Fecal coliform bacteria is monitored at 12 sampling sites in the watershed. Sample collection is conducted once per month during ebb tide to isolate the potential sources of the bacteria in the watershed. The data collected so far has helped to isolate areas of high bacteria counts, which will help to identify sources.

Some of the potential bacterial sources include malfunctioning septic tanks, runoff from livestock pastures, illegal sewage discharges from boats, and waste from domestic animals kennelled within the watershed. If sources of these bacteria can be determined and controlled, the area could potentially be reopened for shellfish harvesting.

In cooperation with landowners and state and federal agencies, efforts will be made to install best management practices, such as fencing, alternate watering sources, waste management plans, and correction of malfunctioning Onsite Disposal Systems. The Natural Resource Conservation Service, through their Charleston County office, has agreed to cooperate with the project through the provision of technical assistance to landowners and the possibility of cost-share financial assistance.



MICROBIAL SOURCE TRACKING; A NEW ASSESSMENT TOOL?

Fecal coliform (FC) bacteria are found in the gut of warm-blooded animals, including humans. Its presence in ambient waters indicates the presence of potential illness-causing pathogens and most states, including South Carolina, limit acceptable levels in waters of the state. Often the source of fecal contamination in water cannot be easily determined. For example, non-point sources such as failing septic systems, and waste from domestic animals and pets, or point sources such as overloads at sewage treatment facilities, overflows from sanitary sewage pumping stations, or flows from sewage pipe breaks may all be candidates. In order to adequately assess human health risks and develop watershed management plans, it is necessary to know the sources of fecal contamination. Recent research into several various identification methodologies is ongoing that purports to allow identification of the sources of the bacteria, e.g., human waste, agricultural areas, pet waste in urban runoff, or wildlife.

Using a Section 319 grant, the South Carolina Department of Health and Environmental Control recently funded two studies that investigated methods for identifying sources of fecal coliform bacteria in the waters of the state. Both were conducted under contract by the NOAA Center for Coastal Environmental Health and Bio-molecular Research (CCEHBR), in Charleston, SC. The CCEHBR has been actively investigating microbial source tracking methods due to the impact of fecal coliforms on coastal resources for several years. The first study (July 1999 – June 2001) was a fresh water study and investigated Multiple Antibiotic Resistance (MAR), Ribotyping, and Coliphage Enumeration as microbial source tracking methods. The second study (May 2001 – November 2003) was conducted in shellfish harvesting waters and investigated the same three methods.

In both studies, MAR and ribotyping results were inconclusive. These methods rely on comparison to a library of known sources. Due to the limited nature of the reference library, the number of matches and the confidence in those matches was low. The number of species represented and the number of samples for each species, the geographic area represented, longevity and specificity of genetic markers, etc., are variables that affect the utility of the reference library. F+ Coliphage typing seems to be a simpler method with more consistent results and it is not dependent on a reference library. However, it provides less information and finding coliphages in adequate concentration for typing was problematic.

Library dependent methods and library independent methods both show promise within certain limits. Where appropriate, specific methods may be used to identify source to type (i.e., human, domestic animals, or wildlife), or to species. However, further research is necessary to define the minimum conditions under which each method can be used with a reasonable degree of confidence.

GETTING TO THE SOURCE ON ISLE OF PALMS

The City of Isle of Palms is involved in a cutting edge, environmentally significant project. It is looking at whether the high concentrations of fecal coliform bacteria (waste) in the drainage system and Intracoastal Waterway are the result of the leachate of malfunctioning or inadequate residential septic tank systems, or other sources. While the city was aware of the necessity to keep the waters clean and free of fecal bacteria for swimming, fishing and shellfish gathering, the city approached the project with some trepidation. Inadequate septic systems would likely mean exploration of costly public works project such as the extension of the public sewer system. In 2001, when the city received a SC DHEC/US EPA 319 grant in the amount of \$115,027 to assist in funding the nearly \$200,000 project, scientists began by first determining which areas of the island produced water samples with high concentrations of fecal coliform bacteria. In partnership with General Engineering & Environmental, LLC (General Engineering), Phase I of the project involved collecting approximately 450 samples from 17 different points on the island to check fecal counts along with a review of historical data. "Tracking the progress of this project has been increasingly fascinating," according to Mayor Mike Sottile. "As the data has accumulated, it has become more and more interesting to follow."

The second phase of the project involved collecting approximately 275 samples over five events at 38 locations. After determining the areas of fecal contamination, 135 samples were sent to labs for DNA analysis to determine the source of the high bacteria counts. Interesting results came back from the labs. The majority of the fecal matter, thus far in the project, is identified as animal. The city has extended the project to collect samples during the peak tourist season when the island is the most heavily populated and when the warm temperatures would contribute to the incidence of bacteria. As the project continues, samples continue to support animal, not human, fecal contamination.

Currently, the project is approaching its final stages where the animal source is being determined by DNA results. Speculation was that those sources might be domestic pets, raccoons and/or birds. Much to the staff's and City Council's surprise, deer might be the source. The city now refers to its problem as "The Bambi Dilemma."

The city must tackle this challenge while at the same time acknowledging that the deer population made the island their home for food and forage long before the island was developed as a residential, recreational community. As the project ends, the city will be preparing for the public presentation of results and developing ideas on methods, if any, to improve the cleanliness of water. Working towards that end, the city has imposed a new septic tank ordinance which will prohibit home buyers from expanding an existing home or building a new one without testing the septic system, improving it or connecting to the public wastewater treatment system. Also, the city prohibits live aboard vessels at its City Marina and received a grant for and maintains a boat pump out facility as part of the marina services. The Public Works Committee of City Council continues to work to improve the drainage system by cleaning the existing system, expanding the piped network, and adding to the collection system. Finally, individual residents and visitors are encouraged to clean up after their pets. Pooper-scoopers are placed at all beach access paths and at the marina for the convenience of pet owners and to encourage compliance with the "Pooper Scooper" ordinance.



SOUTH CAROLINA'S COASTAL NONPOINT PROGRAM

The Coastal Nonpoint Program (CNP) is a component of the statewide Nonpoint Source Management Program and is intended to focus on nonpoint source issues affecting the eight coastal zone counties. The Coastal Nonpoint Program enhances state and local efforts to manage nonpoint pollution by fostering coordinated research, education and management activities. Through the implementation of specific measures, the program addresses sources of polluted runoff affecting the coastal zone, including agriculture, urban runoff, forestry, marinas, and hydromodification (channelization, dams, and streambank erosion).

The Coastal Nonpoint Program is currently focusing on capacity building for coastal communities, which will assist with the development of nonpoint pollution control programs at the local level. These programs and initiatives can incorporate a variety of elements, including, but not limited to:

- Implementation of wetland and riparian buffer ordinances
- Development of onsite disposal system (septic system) ordinances
- Onsite disposal system maintenance and inspection database development
- Best management practice (BMP) demonstration and evaluation
- GIS database development
- Sponsoring educational workshops and training events for NPS-related topics.

The pilot year of this program is currently underway, and the CNP is funding two projects that are concentrating on onsite disposal system maintenance and inspection and ordinance development.

In addition, the CNP is continuing to support ongoing monitoring programs, such as the South Carolina Estuarine and Coastal Assessment Program, in an effort to establish a baseline assessment of coastal water quality indicators. These indicators will be used to identify trends in water quality, which will both determine the effectiveness of current efforts and identify areas where additional emphasis is needed. The CNP is working to provide a comprehensive information clearinghouse to the public through improved web-based applications, such as ArcIMS. These applications will provide an interactive, user-friendly website that will enhance ongoing public education and outreach efforts.

Finally, the CNP is continuing to work towards full program approval and has recently submitted the findings of a study entitled "Determining Seasonal High Water Table: A Comparison of Two Methods" to both EPA and NOAA for review. This study was done in conjunction with SC DHEC's Bureau of Environmental Health.



TMDL, A TOOL FOR WATER QUALITY IMPROVEMENT

The passage of the Federal Clean Water Act laid the groundwork for improving water quality in all of the nation's waterbodies. An important part of that groundwork is contained in Section 303(d) of the Act. Section 303(d) requires that in every even-numbered year, each state will produce a list of impaired waters based on findings from water quality monitoring data. The monitoring data is compared with state water quality standards that specify criteria for the protection of human health and aquatic life, such as fecal coliform bacteria, heavy metals, dissolved oxygen, and turbidity. If the water quality standard is exceeded during the review period, a waterbody is considered impaired and is placed on the 303(d) list. Once on the list, TMDLs (Total Maximum Daily Loads) must be developed for these impaired waters.

In EPA-speak, a TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. TMDLs for a waterbody are calculated based on point source wasteload allocations (industrial discharges, wastewater treatment discharges, etc.), nonpoint sources (pollutants from runoff), natural background sources such as wildlife, and a margin of safety. TMDLs are developed for each pollutant causing impairment to a waterbody. Therefore, a waterbody may have multiple TMDLs if it is impaired by more than one pollutant.

An example used by the Volunteer Monitor publication compares a TMDL to a pie. The pie is the maximum pollutant a waterbody can handle and the slices are the contributing factors. The slices can vary in size and number depending on the land uses in the watershed that is analyzed for the TMDL.

In South Carolina the overwhelming majority of impairments to the state's surface waters, as listed on the 303(d) list, are due to fecal coliform bacteria. These are almost invariably due to nonpoint sources since all point source dischargers are required to disinfect their effluent. The development of a TMDL involves the assessment to determine the characteristics of the impairment. Under what conditions do exceedences of the water quality standard occur: after rain events, under low flow conditions, or perhaps only during hot weather? Answers to these questions will help point to the sources of the impairment. For pathogen (fecal coliform bacteria) caused impaired waters, the sources are typically failing septic systems, cattle with access to streams, runoff from improperly applied manure, leaking or overflowing sanitary sewers, and runoff from urbanized land. A computer model or another method, such as load-duration curves, is used to determine the existing load of pollutant and the Load Allocation (LA) or quantity of pollutant allowed from nonpoint sources for the TMDL.

Before it is submitted to EPA for approval, the public is given an opportunity to comment on the TMDL. The TMDL document is posted on the DHEC web site (<http://www.scdhec.gov/water/html/tmdlsc.html>) and the public is notified of its availability through a mail-out and legal notice in a local newspaper. Subsequent to the public notice period, the TMDL is submitted to EPA for review and approval. Once approved, the TMDL becomes eligible for implementation.

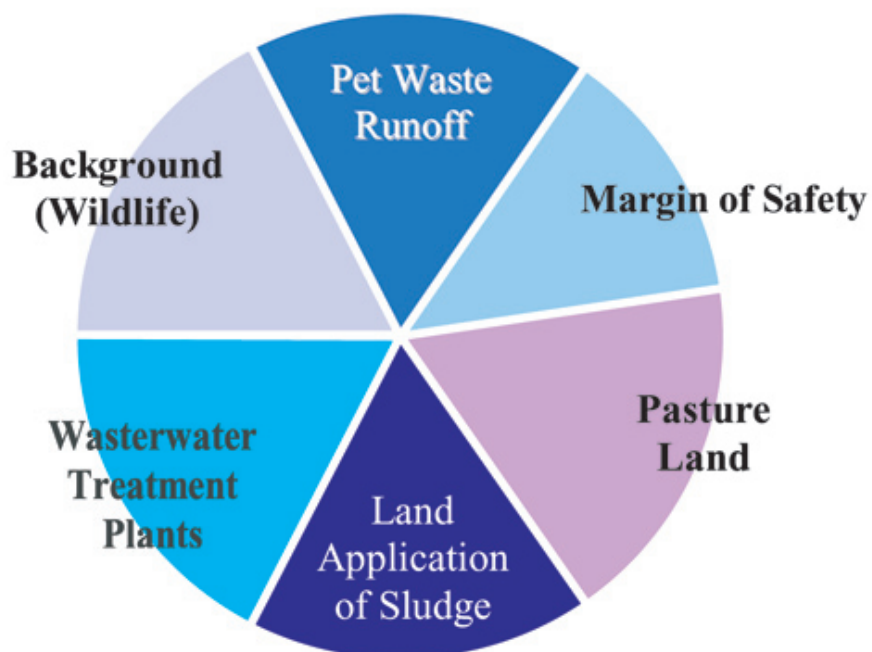
An approved TMDL also establishes the available wasteload allocations for point sources. Permits for NPDES facilities (point sources) and NPDES stormwater permits must be consistent with any TMDL that applies. Generally

DHEC does not have regulatory authority over the control of nonpoint sources. Rather control of nonpoint sources is encouraged by using 319 grants, USDA cost share programs, etc., to encourage landowners, farmers, and interested citizens to voluntarily work to improve the water quality.

Once the TMDL has been developed the next step is implementation. At this point, the TMDL can be used to formulate a strategy to reduce the pollutant loading through best management practices and stream restoration projects in the watershed. It is important to note that watershed stakeholders play a major role in realizing source reductions as TMDLs are implemented.

In response to EPA's Section 319 national guidance, more and more federal nonpoint source funds are being allocated for the development and implementation of TMDLs. In South Carolina, Section 319 nonpoint source dollars are now available primarily for TMDL implementation. To date, ten TMDL implementation projects are underway in twelve watersheds around the state.

Example TMDL “pie” for Fecal Coliform



Whole “pie” = maximum amount of bacteria that the waterbody can handle.



TMDL IMPLEMENTATION PROJECTS UNDERWAY

Ten projects in twelve watersheds that implement 26 TMDLs are currently underway around the state. Summaries of these projects follow.

BUSH RIVER TMDL IMPLEMENTATION PROJECT

Lead Organization: Newberry Soil and Water Conservation District

The Bush River is on South Carolina's 303 (d) list of impaired waterbodies because of violations of the fecal coliform bacteria water quality standard. This TMDL project begins the process of implementation of measures that will ultimately result in achievement of fecal coliform bacteria standards in Bush River.

The goal of this project is to reduce the instream fecal coliform bacteria load by 15 to 17 percent so the fecal coliform standards will be met in the Bush River watershed.

The project is developing and implementing 75 resource management plans that include treatment of 1000 acres of sensitive cropland and pastureland near streams and waterbodies. The project is targeting concentrated animal operations, non-confined animal operations, and individual homeowners.

Planning, developing and applying nutrient management and manure storage systems will reduce NPS pollution from concentrated animal operations. It is anticipated that the fecal coliform loading from this source will be reduced by 75 percent. Impairments from grazing animals will be treated by developing grazing management systems that focus on protecting the riparian zone. Means to limit or prevent the pollutant from entering these areas will be planned and installed. It is anticipated that the fecal coliform loading from this source will be reduced by 50 percent.

CATAWBA RIVER TRIBUTARY WATERSHED TMDL IMPLEMENTATION PROJECT

Lead Organization: City of Rock Hill, South Carolina

The fecal coliform reduction project for the Catawba River tributary was developed to meet the 19% reduction of fecal coliform bacteria in the creek as required by the TMDL. The tributary's watershed is characterized in the 1999 DHEC TMDL document as "developed residential and commercial" and is served by sanitary sewer. The document states that nonpoint sources are believed to be the source of fecal coliform bacteria in this watershed.

The project consists of three primary components to be implemented within the drainage area as follows: 1) an illicit discharge identification project, 2) the design and construction of stormwater run-off treatment BMPs, and 3) a public education/participation program.

The project incorporates a combination of source controls and treatment methodologies. The proposed project includes illicit discharge identification throughout the drainage area; fecal coliform storm water data collection during two storm events with samples collected in the tributary, its side streams, and from commercial parking lots; selection, design and construction of stormwater run-off treatment Best Management Practices (BMPs) within commercial parking lots. A public education/participation program focused on residential pet waste management is also under way.



The project has multiple outputs including source identification, quantification, and verification through both the wet weather and dry weather sampling within the drainage area. The data will form the basis for the elimination of illicit connections and for stormwater treatment design components of the project. The construction project will include structural BMPs designed to treat parking lot runoff for bacteria removal. Area residents will be presented with educational material on nonpoint source pollution with an emphasis on pet waste management. A contest was held to give the "Unnamed Tributary" an official name. The winning name was "Hidden Creek." The new name will be visibly placarded to promote and maintain public awareness.

Implementation of the TMDL within the scope of the proposed project is expected to reduce the geometric mean values of fecal coliform concentrations in the tributary by at least 19% as measured monthly by continued water quality sampling by the DHEC at Station CW-221. The project will result in documented illicit discharge identifications and verification of the disconnections within the drainage area. The local public will become aware of the tributary, associated bacteria TMDL, and be introduced to water quality benefits of proper pet waste management.

Rocky Creek TMDL Implementation Project

Lead Organization: Research Planning, Inc.

Rocky Creek and the Catawba River Watersheds, HUCs 03050103-090 and 03050103-010, lie in upper central South Carolina. Waters in the targeted watersheds violated the state water quality standard for fecal coliform bacteria, and were placed on the 303(d) list. A Total Maximum Daily Load (TMDL) was then developed, and the goal of the cooperating partners for this project (Research Planning, Inc., and Clemson Extension Service) is to implement the TMDL using Best Management Practices (BMPs) on agricultural and rural sites.

Land use in the Rocky Creek watershed is approximately 84% forested, 8% cropland, 5% pastureland, and 2% urban. Potential nonpoint sources of fecal coliform bacteria in this watershed include grazing animals, land application of manure, failing septic systems, urban storm runoff, and leaking and overflowing sewers. Runoff from land (pasture, residential, and urban) and the direct use of streams by livestock were estimated to be the primary sources of nonpoint source loading in this watershed.

Since the project commenced in early 2004, three agricultural landowners have decided to participate in the cost-sharing program, and six additional landowners are considering participation. As of October 2004, BMPs installed and/or in progress include: a feeding shed where manure will be collected and stored properly, a composter/waste storage facility, water lines to additional troughs, 2.5 acres of riparian herbaceous cover planted, 2885 ft. of fencing (for stream protection), 7 tons of crusher run in heavy use areas, and a solar powered well.

Outreach activities that have been implemented include a Home-A-Syst workshop led by Clemson Extension. Septic tank system owners (members of approximately 15 households in attendance) were made aware of potential impacts from leaking/overflowing septic systems in need of repair. A tour of farms where BMPs that were implemented under a previous 319 funded project were showcased. The farm tour was very successful, with over 60 farmers participating. Interest in participation in the cost-sharing aspects of the program for Rocky Creek rose after the tour.



Coneross Creek/Beaverdam Creek Watersheds TMDL Implementation Project

Lead Organization: Clemson Cooperative Extension Service, Oconee County

This TMDL implementation project was designed to reduce the fecal coliform load in the Coneross and Beaverdam Creek watersheds so that the streams meet state water quality standards for FC bacteria. Both watersheds are heavily populated with livestock (poultry and cattle) and they have a significant urban and rural residential population as well. Through cost share assistance from EPA (Section 319 grant funds) and USDA (EQIP cost share funds), landowners are encouraged to implement conservation practices and other BMPs that reduce the potential introduction of fecal coliform into the watershed by either removal of animal waste from the watershed or reduction of runoff potential. This project provides opportunities for both agricultural and residential landowners for financial assistance.

Coneross Creek is the larger of the two adjoining watersheds (47,016 acres), and has varied land uses. The land use is comprised of 50% forested, 39% agriculture, 10% urban. Assessment studies indicate sources of fecal coliform include failing septic systems and uncontrolled discharges, land application of poultry litter, cattle in streams and wildlife. Current loading of fecal coliform is 8.61×10^{12} . The reduction in fecal coliform loading is estimated at 33.4% reduction.

Beaverdam Creek Watershed is comprised of Beaverdam Creek and Mud Creek and their tributaries. Drainage area of the watershed is 9096 acres. Land use is comprised of 30% forested, 69% agriculture, and 1% other. Assessment studies indicate that the majority of fecal coliform NPS are from agricultural activities including runoff from pastures, improper land application of animal waste and animals having access to creeks and streams. Additionally, rural residents depend on septic systems for human waste disposal. Many of these systems, particularly those that were improperly installed or have been poorly maintained, may also be a source of fecal coliform. The reduction in fecal coliform loading is estimated at 54%.

This project has some unique features that should make it successful in improving water quality. By composting and blending, one grower (poultry producer) is able to convert the manure from an AFO into a saleable product that has facilitated the movement of the compost out of the watershed (the manure otherwise would have been land-applied within the watershed). When the grower cleans out the litter and bedding from the broiler houses, it is blended with pine fines. The material is placed in the composting facility for approximately 30-40 days. It is turned regularly to facilitate the composting process. The grower, Alexander Farms, has obtained approval to use pine fines as bedding in the broiler house, which eliminates the need for adding this material as a separate step. The resulting compost/mulch is bagged and marketed to the landscape industry in large metro areas. The grower is successfully marketing the product at a volume of approximately 6,000 tons per year of finished product from 18 poultry houses.

Through the second year of this three-year project, contracts for the installation of seventy-six (76) agricultural BMPs on fifteen (15) farms have been secured. The BMPs include composting sheds at poultry operations and cattle exclusion fencing/alternate water source/buffer establishment on farms where cattle are ranged. At this point, thirty-three (33) BMPs have been installed on ten (10) farms. Additionally, there have been sixteen (16) rural residential septic systems repaired or replaced.



Fishing Creek Watershed TMDL Implementation Project

Lead Organization: York County Conservation District

The Fishing Creek watershed lies in the north central quadrant of South Carolina and is designated as HUC 03050103-050, 060, and 070. The project was recently approved for funding under Section 319 and will get underway around the first of 2005. It will be implemented by a partnership of organizations including the York and Chester Soil and Water Conservation District, Clemson Extension Service, York County Government, USDA-NRCS, Chester and York County Cattlemen's Associations and Research Planning, Inc. Each partner will bring expertise to the project in order to implement the TMDL, which will reduce the load of fecal coliform bacteria in the watershed so that state water quality standards for this pollutant are met.

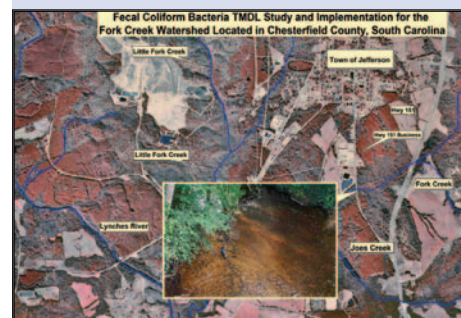
There are 11 DHEC monitoring stations in the watershed that are on the State's 303(d) list for violations of fecal coliform standards and TMDLs for these were developed and approved. An average reduction of 48% in the fecal coliform load will be needed to meet and maintain state water quality standards. Participants in the project will use local knowledge, sampling, and spatial data analysis to characterize sites in the watershed that have high fecal coliform loading. Best Management Practices and effective outreach activities will then be utilized to benefit water quality relative to cost on selected sites.

Fork Creek Watershed TMDL Implementation Project

Lead Organization: Pee Dee Resource Conservation and Development District

This project, which began in May 2004, is approximately half way into the first year. Phase one involves a study supporting the development of a Total Maximum Daily Load (TMDL). The first action of this project was to establish a working group of stakeholders to serve as advisory panel for TMDL allocations and future watershed management activities. The project is now nearing completion of the process of identifying and characterizing sources of fecal coliform bacteria impairment through a review of existing database information and on-the-ground surveys. During the second half of the first year, the study phase, efforts will be devoted to performing the modeling and analysis necessary to support a final TMDL allocation and report addressing the basic requirements specified by the USEPA. Once the TMDL modeling effort is completed, the second and third years of the project will be dedicated to implementing corrective measures that reduce the loading of fecal coliform bacteria from NPS sources according to the plan advocated in the finalized TMDL allocation scenario.

In the Fork Creek watershed above its confluence with the Lynches River recreational uses are partially or not supported due to fecal coliform bacteria excursions. It is assumed that waterbodies possessing high concentrations of fecal coliform bacteria may also be contaminated by pathogens, or disease producing bacteria or viruses, which can also exist in fecal material. Some waterborne diseases associated with fecal material include typhoid fever, viral and bacterial gastroenteritis, and hepatitis A. Fecal contamination is frequently used an indicator of potential health risks for individuals exposed to this water. Fecal coliform bacteria may occur in ambient water as a result of the overflow of domestic sewage or nonpoint sources (NPS) of human and



animal waste. High fecal coliform bacteria concentrations in the Fork Creek watershed above the Lynches River confluence are; therefore, a concern because the Creek is located adjacent to the Town of Jefferson. This area contains relatively high concentrations of livestock and poultry enterprises, including twenty beef cattle operations totaling approximately 2,000 head of livestock and 12 poultry operations with more than 600,000 birds.

Potential sources of fecal coliform bacteria loading into Fork Creek are numerous. The Town of Jefferson wastewater treatment plant discharges treated waste into a minor tributary of Little Fork Creek. An ambient water quality monitoring station on Little Fork Creek (PD-215), located just downstream of where the minor tributary meets Little Fork Creek, is not showing a bacteria violation of the standard. Furthermore, Little Fork Creek discharges into Fork Creek downstream of the two ambient water quality monitoring sites on Fork Creek that are showing excessive concentrations of fecal coliform bacteria (PD-067, PD-068). Consequently, the wastewater treatment plant discharges are not considered major contributors to the Fork Creek watershed's bacteria impairment.

Potential agricultural NPS pollutant sources of fecal coliform bacteria include grazing livestock, livestock depositing manure directly into Fork Creek and its tributaries, and land application of poultry litter. Urban NPS pollution is also considered a potential loading source of bacteria due to the vicinity of the Town of Jefferson (population of approximately 700). The Town is located just north and upstream of the two ambient water quality monitoring stations showing bacteria violations. Additional potential sources of bacteria that will be investigated by the proposed TMDL study include loads derived from wildlife and malfunctioning septic systems. An estimate of the number of failing septic systems will be made using statewide averages applied to the existing systems in the project area.

Phase two of the project will involve implementation of the TMDL in the watershed. The goal will be to reduce the fecal coliform bacteria load to a level where state water quality standards for FC are met. To do this, cost share financial assistance will be provided to land owners for water quality BMPs and outreach activities will be conducted.

Scape Ore Swamp Watershed TMDL Study and Implementation Project

Lead Organization: Santee Wateree Resource Conservation and Development District

The Scape Ore Swamp is a large stream system including a mainstream and tributaries extending from western Lee County into Kershaw County. The South Carolina 303(d) list shows that fecal coliform impairment occurs at the DHEC ambient water quality monitoring station (PD-355) in Lee County. This Section 319 funded project will conduct a study leading toward development of a fecal coliform TMDL, and then implement the TMDL.

Major tributaries to the impaired Scape Ore Swamp in the project area include Timber Creek, Black Creek, Cedar Creek, and Beaverdam Creek. The watershed is approximately 95 square miles in size. According to the state basin-wide plan for this Scape Ore Swamp subwatershed (03040205-030), there exists a permitted minor industrial effluent point source in the headwaters of the Black Creek tributary to Scape Ore Swamp. But the point source is situated at the extreme opposite side of the watershed from the ambient water



quality monitoring station. The vast majority of the watershed is composed of agricultural or forestry lands. The major cropland product is cotton. Many producers also generate poultry waste. It is estimated that over 14,000 tons of poultry waste is being spread annually on watershed cropland. In addition, many poultry producers still use burial pits to dispose of dead birds. The topography of the watershed is gently rolling with slopes ranging from one to six percent. Many producers are leaving plowed fields barren after harvest creating soil erosion and water quality problems. Excessive runoff from these unprotected fields is contaminated with silt, chemicals, fecal coliform, and other harmful bacteria. Livestock watering in streams also remains a concern.

Thompson Creek Watershed TMDL Implementation Project

Lead Organization: Pee Dee Resource Conservation and Development District

This watershed, located in South Carolina's Pee Dee region, is designated HUC 03040201-060 and is predominated by agricultural land use. The Thompson Creek TMDL determined that a 68% to 82% reduction in FC bacteria was needed to meet water quality standards. Potential agricultural NPS pollutant sources of fecal coliform bacteria include grazing livestock, livestock depositing manure directly into streams and its tributaries, and land application of poultry litter. Additional potential sources of bacteria include loads derived from wildlife and malfunctioning septic systems.

The Thompson Creek watershed above S-13-243 is located predominately in Chesterfield County. Several tributaries to Thompson Creek possess headwater segments that extend into Anson County, North Carolina. The sum of the stream reaches in the watershed is approximately 143 miles. The following information is associated with the South Carolina portion of the watershed:

In the South Carolina portion of the watershed there are approximately 6,000 acres of active cropland, of which 3,500 acres are currently utilizing poultry litter as the main source of fertilization. Most of these acres have a long history of animal waste use for fertilization (greater than 20 years). Approximately 90 percent of the cropland acres are highly erodible, with an average annual erosion rate of 17 tons/acre/year with the use of conservation tillage. Without conservation tillage, erosion rates range as high as 80 tons/acre/year. No filter strips, diversions, waterways, or similar Best Management Practices (BMPs) have been installed for the purpose of filtering waste nutrients. There are approximately 4,000 acres of pastureland with approximately 1,500 acres using poultry litter. Most pastureland is severely overgrazed, averaging one cow/calf per acre. Most cattle are watered directly from ponds and streams. Stream bank erosion is prevalent with many bare spots in pastures.

This project, which began in May 2004, is in the Best Management Practice (BMP) planning phase with only five practices applied at this time. These applied practices relate to livestock exclusion from stream areas. To date, three farm operations have been involved in practice application. This project is scheduled to assist approximately 27 additional farm operations with practice application over the next 30 months. Planning of these practices has been initiated for 12 operations with implementation scheduled for 30 practices over the next 25 months. Additional plans will be prepared in the coming months.

Thompson Creek Fecal Coliform Bacteria TMDL Implementation Project

Section 319 Nonpoint Source Implementation
Grant Project Conducted by:

Chesterfield Soil and Water
Conservation District

Pee Dee Resource Conservation and
Development Council

Natural Resources Conservation Service

South Carolina Department of
Natural Resources

Funding for this project was provided by
the US EPA under a section 319 grant
through the SC Department of Health and
Environmental Control (SC DHEC).

Failing Septic Systems are also eligible for
project cost/share assistance.



Failed septic systems release wastewater from houses and businesses before it receives full treatment. The most noticeable effect of a failing septic system is the smell at the point of surfacing effluent. If the system has been failing for some time, or the effluent is concentrated, gray slimy algae can be associated with the discharge. Improperly treated wastewater contains high levels of pathogens that can cause diseases in humans who contact the water.



This Brochure developed by the
Pee Dee Resource Conservation
and Development Council.
www.pdeec.org

The first action of this project was to establish a steering committee to provide local guidance in prioritizing applicant sites and BMPs for funding. The steering committee is composed of agency personnel, landusers, and community leaders. Generally, the sites/BMPs with the greatest potential for improving water quality are being given the highest priority. Landusers are being contacted and encouraged to participate in the project using financial cost share assistance. A project brochure describing eligible BMPs has been developed and is being printed and distributed to area landowners. Also, a news release has been published in local papers describing the project purposes and targeted nonpoint sources, including failing septic systems. A project field day to demonstrate/present applied BMPs will be conducted in the summer/fall of 2005.

TWELVE MILE CREEK WATERSHED TMDL IMPLEMENTATION PROJECT

Lead Organization: Pickens Soil and Water Conservation District

The Twelve-Mile Creek watershed lies wholly in Pickens County. The watershed includes eight sub-watersheds, with the HUC identifiers 03060101-060-010, 03060101-060-020, 03060101-060-030, 03060101-060-040, 03060101-060-050, 03060101-060-060, 03060101-070-010, and 03060101-070-020.

The watershed encompasses 60% of the land mass of Pickens County and has five DHEC sampling sites that exceed the allowable limits for fecal coliform bacterial contamination. The project goal is to reduce fecal coliform loads by the amount recommended in the 2003 TMDL assessment to achieve TMDL load reductions within the Twelve-Mile Creek watershed and thereby reduce the bacterial contamination in this watershed.

Grazing animal BMPs will be installed and demonstrated, and BMP outreach and education will be conducted throughout the watershed. Potential fecal coliform loading sources include both rural and urban sources with problems originating from animal agriculture, such as open access of livestock to streams, failing septic systems, and pet waste mismanagement. The education efforts for TMDL reduction of fecal coliform for urbanizing areas will be conducted in all eight sub-watersheds.

The project is being accomplished through a cooperative effort by the following entities:

- Conservation District Commissioners and Associate Commissioners (volunteer time)
- Pickens County Environmental Services (GIS and education assistance)
- Producers will provide BMP in-kind contributions for installation and management.
- Clemson University will provide education and demonstration assistance
- Pickens Conservation District will provide office space and use of equipment, maps, and files.

UPPER LITTLE PEE DEE RIVER TMDL DEVELOPMENT AND IMPLEMENTATION PROJECT

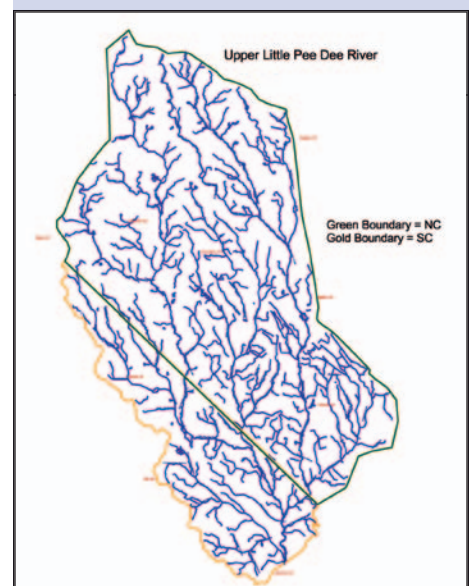
Lead Organization: Pee Dee Resource Conservation and Development District

The Upper Little Pee Dee River watershed project area is located in the Little Pee Dee Watershed (03040204-010, -020, -040, and part of -030) of the Pee Dee River Basin in South Carolina and extends northward into the North Carolina Lumber River Sub-basin. The environmental health of the Upper Little Pee Dee River watershed is currently threatened by excessive concentrations of fecal coliform bacteria. This Section 319 funded project, which began August 16, 2004, is very early into the first year which is devoted to a study supporting the development of a Total Maximum Daily Load (TMDL). A project consultant has been selected to assist with the study phase. The next action of this project will be to establish a working group of stakeholders to serve as advisory panel for TMDL allocations and future watershed management activities. The project will then begin the process of identifying and characterizing sources of fecal coliform bacteria impairment through a review of existing database information and on-the-ground surveys. During the second half of the first year, the study phase, efforts will be devoted to performing the modeling and analysis necessary to support a final TMDL allocation and report addressing the basic requirements specified by the USEPA. Once the TMDL modeling effort is completed, the second and third years of the project will be dedicated to implementing corrective measures that reduce the loading of fecal coliform bacteria from NPS sources according to the plan advocated in the finalized TMDL allocation scenario. Also, a proposal has been submitted to the Conservation Partnership Initiative (CPI) of USDA-NRCS for the funding of a project complimentary to this one. This CPI project, if funded, will develop a comprehensive watershed plan for this project area.

Potential sources of fecal coliform bacteria loading into the Upper Little Pee Dee River are numerous. The project partners will review wastewater treatment plant discharges and incorporate their estimated fecal coliform bacteria loads in the TMDL model. Because the facilities are meeting their regulatory requirements for bacteria loading, the wastewater treatment plant discharges are not considered major contributors to the Upper Pee Dee River watershed's bacteria impairment.

Potential agricultural NPS pollutant sources of fecal coliform bacteria include grazing livestock, livestock depositing manure directly into the Upper Little Pee Dee River and its tributaries, and land application of poultry litter. Urban NPS pollution is also considered a potential loading source of bacteria due to the location of the City of Laurinburg, North Carolina in the headwater areas of the watershed. In addition several small towns, including the Town of McColl, South Carolina and the Town of Gibson, North Carolina are found in the watershed. These urban and residential areas are all located in the extreme headwaters of the project area, over 15 miles from the Rt. 23 bridge ambient water quality monitoring station.

Additional potential sources of bacteria that will be investigated by this proposed TMDL study include loads derived from wildlife and malfunctioning septic systems. An estimate of the number of failing septic systems will be made using statewide averages applied to the existing systems in the project area. The local health department and local septic tank contractors will also be consulted for information.



FORESTRY BMP PROGRAM RAISES RATE OF COMPLIANCE

South Carolina has a unique forestry Best Management Practice (BMP) compliance program, funded in substantial part by grants under Section 319 of the federal Clean Water Act. The Section 319 money supports aerial surveillance in every major drainage basin once a month by the state Forestry Commission. The flights look for active logging sites, and the state has five regional foresters assigned to these surveillance operations. Once forestry activities are spotted from the air, tax records are checked to determine the owner of the land, and staff of the Forestry Commission's BMP program seek permission to go on the site; they have only been denied access six times in four years of work.

These foresters then conduct a "courtesy BMP exam" on the site. The process provides a kind of substitute for pre-harvest notification (for which there is no requirement in the state) and gives state foresters an opportunity to provide recommendations for compliance with BMPs that are intended to prevent problems. A follow-up inspection is then conducted to ensure that the harvest was in fact completed within guidelines. If problems are found (for example, a temporary stream crossing left in place), the operator is given 30 days to correct them. If the problems are not corrected in that time, the offending property and operator are reported as having "failed" a courtesy BMP exam in the Commission's monthly exam summary. That summary report is then passed on to the state Department of Health and Environmental Control, which has enforcement authority under the state's Pollution Control Act, and to the companies that are the principal buyers of timber in the area. Those buyers, who are mostly members of the American Forest and Paper Association, and who subscribe to the principles of its Sustainable Forestry Initiative, have made it a policy not to buy from loggers and owners who appear as "failures" on the monthly summary exam report. Therefore, there is substantial market incentive to avoid showing up on the report.

The Forestry Commission annually measures the rate of compliance with water quality BMPs on harvest sites statewide. For the 12-month period between September 2003 and August 2004, statewide compliance with the BMPs was 94%. This was up from 91.5 % in the previous year, and 85 % when the program began in 1990. By contrast, on sites that received a "courtesy BMP exam", compliance was 99.16% for the same period.

Silviculture is exempt from state permits, but the basic water pollution law in South Carolina includes a general prohibition against "discharge(s) into the environment . . . except as in compliance with a permit." Violations may garner penalties including injunctions, civil penalties up to \$10,000 per day, and criminal penalties up to \$25,000 per day and/or imprisonment up to two years. Nuisance remedies are also available. Obstruction of a navigable stream without a permit or other authorization is actionable as a nuisance. Specific provisions make the throwing of treetops, brush and the like into a navigable stream punishable by fines up to \$250 and/or up to two years in prison. The state may also recover damages for discharges to state waters that damage fish or other aquatic life.

On average, about two sites per year have warranted fines in the past seven years, and those fines have ranged from \$1500 to \$55,000. In the context of the courtesy BMP exam, generally it is the logger or contractor/broker who is reported as having "failed" the exam. But where fines for water quality impacts are involved (which is the province of the state's Department of Health and

Environmental Control), liability may also flow to the landowner, and there have even been cases where foresters were pursued.

Scenic river regulations apply only to state-owned lands, though some counties now have regulations concerning buffers and streamside management zones along scenic rivers. York County, for example, requires a 100-foot buffer along the Catawba River. A permit is required to obstruct navigable waters, and sanctions are available to enforce that requirement.

South Carolina has no Master Logger requirement. It does, however, have a Timber Operations Professional Logger (or "TOP Logger") program, that is administered in cooperation with the South Carolina Forestry Association. Forestry Commission foresters regularly teach sessions on streamside management zones, road construction, site preparation and harvest, both within the TOP Logger program and as separate activities. As in other states, timber buyers that subscribe to the Sustainable Forestry Initiative generally insist on a TOP Logger's involvement in any harvest from which they buy timber.

South Carolina's coastal regulatory scheme includes zoning ordinances in critical areas, in the context of a management plan developed by DHEC's Coastal Division. The aerial surveillance of the state's BMP program also supports the Coastal Zone Act Reauthorization Amendments coastal NPS plan; pollution from any source in the coastal zone is reported to the appropriate agencies. Though the Section 6217 program is not expected to have significant impacts on silviculture, workshops for forestry operators on the importance of streamside management zones (SMZs) are a significant part of the state's nonpoint source management program. The workshops are conducted by the South Carolina Forestry Commission and are expected to help minimize forestry's impact on both upland streams and waterbodies in the coastal zone.



NEMO IN THE BCD REGION

NEMO, Nonpoint Education for Municipal Officials, is a program to make local officials aware of the problems associated with nonpoint source pollution, and how planning, zoning, and land development decisions impact water quality. In the Berkeley County, Charleston County, Dorchester County region of South Carolina's low country, the B-C-D Council of Governments (COG) were aware of the water quality problems associated with the accelerated urban growth in the region, and used the NEMO program as a vehicle to educate council members, planning commissioners, and planning staff. Their program was modeled on the one first developed by the University of Connecticut in 1991, and later refined by the SC Sea Grant Consortium and Clemson University Extension in South Carolina. It was funded using a Section 319 grant from EPA through the SC Department of Health and Environmental Control.

In the B-C-D Region, development is outpacing population growth by a factor of six to one. The adverse impact on the region's water resources, which are its greatest asset, by this development was the reason for implementing the program. The B-C-D COG prepared a series of fact sheets, presentations, maps, web site, and manual for this purpose. The fact sheets covered such subjects as NPS pollution, impacts of development on waterways, strategies for coping with polluted runoff, reviewing site plans for stormwater management, etc. The maps were visual representations of watershed boundaries, impaired watersheds, land cover, and current and projected imperviousness by watershed. The manual, titled "Taming Stormwater Toolbook", looks at controlling NPS pollution and stormwater runoff from a policy/planning viewpoint rather than a technical/engineering viewpoint. The fact sheets, maps, and manual were incorporated into a presentation given to local officials. The presentation was made at a series of 19 workshops around the three counties during 2002 and 2003. In all, approximately 80 people attended the presentations.

Evaluation of the workshops concluded that participants came away with a greater understanding of the impacts of NPS pollution, thought the workshops provided useful information for future decision making (98%), and would use the workshop information in community planning, site design, and use of BMPs (86%).

The "Taming Stormwater Toolbook" is a unique manual that would make a useful guide for local officials in most any urban jurisdiction. It starts off by introducing NPS and its relationships to imperviousness. It goes on to discuss comprehensive planning techniques to minimize NPS such as conservation easements and compact developments. Under zoning techniques, such topics as density zoning, overlay zoning, and watershed zoning are discussed. The Section on land development design discusses ways to reduce imperviousness in the site plan, and the BMP Section discusses all applicable measures, their costs, advantages, and disadvantages. The final pages of the Toolbook include a resource guide and a codes and ordinances worksheet.



SEMINAR YIELDS RESULTS

The stormwater utilities, public works departments, drinking water systems and other entities that are tasked with providing public education and outreach have many challenges. A complex environmental message to deliver to a diverse audience, limited staff, and limited resources to create and implement programs are just a few.

To help meet this outreach challenge, DHEC's Bureau of Water, the SC Soil and Water Conservation Society, the Lake and Watershed Association of SC, the SC Sustainable Universities Initiative, and the US EPA sponsored "Getting In Step," a workshop on creating effective public outreach. Over 100 participants attended the October 13th workshop in Columbia.

Did the workshop help participants "get in step" on outreach? Workshop evaluations showed that participants increased their knowledge on average by 26%. They intend to use at least 77% of the information they learned, and most participants felt the workshop will help them meet the outreach goals of their organization.



BEAUFORT COUNTY MODEL RIVER BUFFER PROJECT

Beaufort County is located in South Carolina's low country, where the natural environment is the county's greatest resource. It provides an excellent quality of life for residents, fuels a booming tourism and retirement community industry and provides an abundance of shellfish and other marine delicacies. The quality of Beaufort County's marshes and waterways is vital to the overall health of the community. As more homes and businesses come to Beaufort, providing vegetated buffers adjacent to tidal wetlands can minimize the impacts on the County's estuarine environment.

The River Buffer Project is a model river buffer for existing urban landscapes that serves to educate the community, developers, homeowners, and other interested parties on the importance of natural vegetated buffers along Beaufort County's waterways. The project is located at the County Government Complex, adjacent to the headwaters of Battery Creek. The project was funded by \$20,000 in grants through the South Carolina Forestry Commission and DHEC's Office of Oceans and Coastal Resource Management.

The site area is roughly 400 linear feet of marsh frontage. Prior to the installation of buffer vegetation, the site area consisted of a mowed lawn with a dozen existing trees. A local landscape architect firm prepared a landscaping plan, which called for the installation of over 1,300 plants ranging from large trees to shrubs, perennials, and ground cover. The Beaufort County Public Works Department provided the labor for the project. They removed the lawn from the site area, installed an irrigation system, and planted the buffer. The landscape architect oversaw the installation of plant materials to insure that proper methods were used.

Vegetated riparian buffers have many benefits including:

- They improve water quality by minimizing stormwater runoff and pollution.
- Riparian buffer vegetation traps sediments, pesticides and other pollutants.
- Buffers provide wildlife habitat.
- They reduce shoreline erosion: The root systems of buffer vegetation absorb stormwater and stabilize shoreline soil.
- Buffers create a sense of place and privacy: Buffer vegetation provide shade, frames desirable views, screens undesirable views and reduces noise from watercraft and from neighbors.

Vegetated buffers collectively benefit the overall aesthetic qualities of Beaufort County's marshes and waterways and therefore benefit all who use and enjoy them.



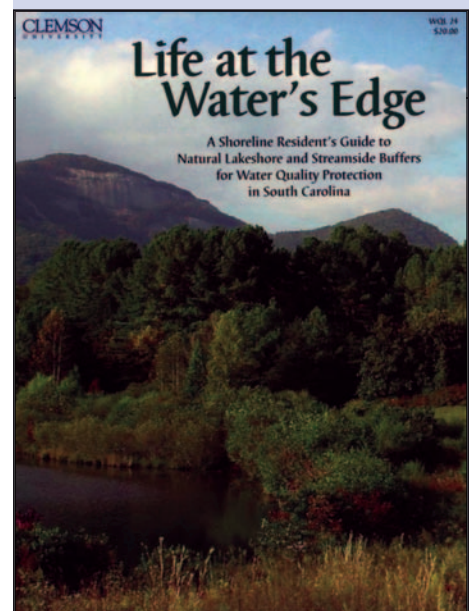
NEW SC SHORELINE GUIDE AN EXCELLENT TOOL FOR WATER QUALITY PROTECTION

Even if you don't live on a lake or stream, you will still want a copy of *Life at the Water's Edge*, A Shoreline Resident's Guide to Natural Lakeshore and Stream-side Buffers for Water Quality Protection in South Carolina.

This interesting to read and beautiful to look at guide contains chapters on the importance of watersheds in understanding waterbodies, a guide to South Carolina shoreline plant and animal life, the ecology of healthy and stressed aquatic systems, advantages and functions of shoreline buffers, the design of buffer strips, and the establishment and maintenance of shoreline vegetation. The appendices provide resources for further reading, regional lists of plant species for buffers, and an index of terms used in the text. Use this guide to implement shoreline management practices that are truly solutions to runoff pollution.

Life at the Water's Edge is the result of collaboration among Clemson University faculty, Clemson Extension, and private landscaping professionals. It was supported with EPA funding via a SCDHEC 319 grant.

The guide is available from Clemson University for \$20 by calling 1-888-772-2665, or it can be purchased on the web at <http://cufan.clemson.edu/olos/cu4.htm>. Refer to publication WQL 24.



USC'S GREEN DORM MEANS CLEANER STORMWATER

West Quad, also known as the Green Dorm, is the University of South Carolina's newest residence hall. The hall is a 500- bed apartment style facility that has been certified as a LEED (Leadership in Energy and Environmental Design) green building by the US Green Building Council. It is among the first green residence halls in the country and the first certified green living and learning center in the world. Open in August 2004, the complex addresses environmental concerns in the areas of sustainable site selection, energy conservation, water efficiency, building materials and resource use and indoor environmental quality. West Quad also addresses stormwater management.

Green buildings typically address major issues such as erosion and sedimentation control and stormwater management concerns, but West Quad has gone a step further. The planning and current construction of the site was based on an integrated design that includes phyto-remediation techniques, plant selection, sedimentation basins and a turf roof. The site is located on a southern pointed slope with four buildings on the perimeter creating an interior courtyard. This insures that all the rainwater that falls on the roofs and landscaping can be directed into the system and allows the property to act as a giant bio-filtration and retention system.

The interior courtyard has islands throughout the landscaping that contain a mixture of local soils and sand. These islands include special plants that can live in dry conditions throughout the year, but absorb high amounts of water when it rains. The plants and islands act as giant filters and help with stormwater runoff by absorbing as much water as possible, keeping it out of the stormwater system and streams.

The amphitheatre located in the center of West Quad's courtyard allows water to flow down through the site without causing erosion problems. Additional islands located on the ends of each terrace also help with absorption and filtration. Any water that is not absorbed is directed by underground piping to the lower portion of the site to a sedimentation basin. The basin will contain additional phyto-remediation plants and therefore help to absorb the extra water. Any water that is allowed to flow to the nearby stream will be minimal but at the same time filtered through the site and therefore be as clean if not cleaner than when it fell out of the sky. All runoff from maintenance parking areas, loading docks and trash collection areas is also be directed through the system to allow for removal of any possible contaminants.

West Quad's learning center includes a turf roof that consists of twelve inches of soil over concrete decking. The soil depth allows for a variety of plants including shrubs and small trees to be planted on the roof. The park like setting is open to students to enjoy and experience the benefits of the green roof. Green roofs have been used throughout history and have been very popular in Europe over the past decades. This proven technology is being implemented into West Quad not only for its aesthetic contribution but for its many environmental and conservation benefits.

Green roofs by their nature contribute to the management of stormwater by minimizing runoff and therefore lessen the burden on the stormwater sewer system and eliminate any contribution for potentially flooding a local stream. They also contribute to the overall design of the site by working with the phyto-remediation system to absorb and filter water and keep sediment and contaminants out of local waterways. Green roofs also minimize heat islands.

Traditional roofs contribute to increased temperatures in urban areas by as much as ten degrees. Green roofs absorb the rainwater then release it through evaporation creating a natural cooling effect.

The green roof also provides a cost savings for the University by reducing energy requirements. The slow transfer of heat through the turf roof reduces cooling needs. In colder months, the roof acts as natural insulation to keep the building warmer. The use of plants on the roof as well as throughout the site contribute fresh oxygen and help to control and minimize dust issues therefore improving air quality. These are all contributions and savings that will continue year after year for the life of the building.

USC has taken a major step toward controlling stormwater runoff and improving the quality of life in an urban setting by the use of this integrated design system. The site serves as a teaching tool and an example for the rest of campus and the Southeast, encouraging others to construct green buildings and utilize green roofs.



DIRECTIONS FOR THE FUTURE

This report makes it clear that South Carolina is making significant progress toward attaining the goals set forth in its NPS Management Program. The state is now able to show measurable reductions in nonpoint pollutant loads of sediment, and nutrients that will lead to water quality improvement in many of its waterbodies that are impacted by runoff pollution. Beginning in 2002, and for the foreseeable future, most Section 319 grant program resources are and will be focused on implementing Total Maximum Daily Loads in watersheds where TMDLs have been developed. By definition, these efforts will reduce the pollutant load to a level that meets the state standard for that pollutant, thus meeting one of the most important goals of the NPS Management Program. Ten TMDL implementation projects implementing 29 fecal coliform TMDLs are currently underway, and many more will commence shortly as more and more TMDLs are developed. Money becomes the limiting factor however, and the challenge arises to find the financial resources to continue the implementation projects at the needed level. Efforts will continue to build capacity, including seeking USDA NRCS funding through EQIP.

Correcting NPS problems in South Carolina's coastal watersheds is an ongoing challenge because of the sensitive ecosystems that are so easily damaged by pollution and because of the tremendous growth and development that is occurring in the coastal counties. The State has prepared what it believes to be an effective and implementable Coastal Nonpoint Pollution Control Program under Section 6217 of the Coastal Zone Act Reauthorization Amendments. The current challenge is to receive full approval of the state's program. It is hoped that EPA and NOAA will fully approve the CNPCP in 2005 so that it can continue to be implemented.

March 2003 marked the expansion of the SC Municipal Stormwater Separate Sewer System (MS4) permit program to include an additional 50 to 60 urban jurisdictions. The state's largest jurisdictions of Richland and Greenville counties, which include the cities of Columbia and Greenville, already had permits. This means that most of the state's medium sized towns and other urban places (50,000 to 100,000 in population) are required to implement a stormwater permit issued to them by DHEC. Under the terms of the permit, urban stormwater pollution must be addressed through source monitoring, BMP implementation, and public education. It is anticipated that implementation of these requirements will dramatically reduce runoff pollution from urban sources statewide.

Passage of the US Department of Agriculture Farm Bill in 2002 includes a provision to greatly expand conservation and land retirement programs and emphasizes on-farm environmental practices. Specifically, the new law greatly increases funding for the Natural Resources Conservation Service Environmental Quality Incentive Program (EQIP) over the next five years (\$700 million nationally in FY 2003, \$1.0 billion in FY 2004, \$1.2 billion in FY 2005 and 2006, and \$1.3 billion in FY 2007). The purpose of the EQIP program is to cost share with producers to implement water quality BMPs on their farm. These expanded programs will undoubtedly help to reduce nonpoint source impacts due to agricultural related activities. The SC NPS Management Program cooperates closely with the NRCS and other USDA agencies, and pledges to continue cooperative efforts.

South Carolina clearly understands that it is imperative to show quantifiable improvements in water quality and reduction of nonpoint source loads as a result of NPS program implementation, especially Section 319 funding.

Several mechanisms are in place or will soon be implemented that will result in ways to yield hard data. Results reporting is a requirement of all Section 319 funded projects. Beginning in FY 2003, the Grants Reporting Tracking System (GRTS) that DHEC uses to report to EPA includes new features that make it feasible to report quantifiable reductions in pollutant loads. South Carolina is making full use of these new features. Also, the focus of funding resources on TMDL implementation will produce measurable water quality improvements in the state's waterbodies.

South Carolina intends to build upon its successful NPS management program, always seeking additional resources and technology to reduce nonpoint source pollution in the State's waterways so that the mission of the DHEC Bureau of Water may be realized: "Our mission is to ensure that all water resources of South Carolina are of a quality suitable for use by all citizens and that all surface waters are of a quality suitable to support and maintain aquatic flora and fauna."



SOUTH CAROLINA NONPOINT SOURCE PROGRAM CONTACTS

Doug Fabel

State NPS Coordinator
SC DHEC Bureau of Water
2600 Bull St.
Columbia, SC 29201
(803) 898-4222

fabeldj@dhec.sc.gov

Deborah Clemons

Program Coordinator
SC DHEC Bureau of Water
2600 Bull St.
Columbia, SC 29201
(803) 898-4245

clemonda@dhec.sc.gov

Kathy Stecker

Watersheds and Planning Section Manager
SC DHEC Bureau of Water
2600 Bull St.
Columbia, SC 29201
(803) 898-4011

steckemk@dhec.sc.gov

For more information visit us on the internet at
www.scdhec.gov/water

A report by the South Carolina
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